

#28

K. Keen

ENTERED



1600

RAW SEQUENCE LISTING

DATE: 09/22/2003

PATENT APPLICATION: US/09/537,710C

TIME: 13:26:07

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

```

1 <110> APPLICANT: Dahlquist, Anders
2      Stahl, Ulf
3      Lenman, Marit
4      Banas, Antoni
5      Ronne, Hans
6 <120> TITLE OF INVENTION: A new class of enzymes in the biosynthetic pathway for the
production
7      of
8      triacylglycerol and recombinant DNA molecules encoding these enzymes
9 <130> FILE REFERENCE: BASFnae337799PCT1-15
C--> 10 <140> CURRENT APPLICATION NUMBER: US/09/537,710C
11 <141> CURRENT FILING DATE: 2000-03-30
12 <150> PRIOR APPLICATION NUMBER: EP 99106656.4
13 <151> PRIOR FILING DATE: 1999-04-01
14 <160> NUMBER OF SEQ ID NOS: 19
15 <170> SOFTWARE: WordPerfect version 6.1
17 <210> SEQ ID NO: 1
18 <211> LENGTH: 1986
19 <212> TYPE: DNA
20 <213> ORGANISM: Saccharomyces cerevisiae
21 <220> FEATURE:
22 <221> NAME/KEY: CDS
23 <222> LOCATION: (1)..(1983)
24 <400> SEQUENCE: 1
25      atg ggc aca ctg ttt cga aga aat gtc cag aac caa aag agt gat tct      48
26      Met Gly Thr Leu Phe Arg Arg Asn Val Gln Asn Gln Lys Ser Asp Ser
27      1          5          10          15
28      gat gaa aac aat aaa ggg ggt tct gtt cat aac aag cga gag agc aga      96
29      Asp Glu Asn Asn Lys Gly Gly Ser Val His Asn Lys Arg Glu Ser Arg
30      20          25          30
31      aac cac att cat cat caa cag gga tta ggc cat aag aga aga agg ggt      144
32      Asn His Ile His His Gln Gln Gly Leu Gly His Lys Arg Arg Arg Gly
33      35          40          45
34      att agt ggc agt gca aaa aga aat gag cgt ggc aaa gat ttc gac agg      192
35      Ile Ser Gly Ser Ala Lys Arg Asn Glu Arg Gly Lys Asp Phe Asp Arg
36      50          55          60
37      aaa aga gac ggg aac ggt aga aaa cgt tgg aga gat tcc aga aga ctg      240
38      Lys Arg Asp Gly Asn Gly Arg Lys Arg Trp Arg Asp Ser Arg Arg Leu
39      65          70          75          80
40      att ttc att ctt ggt gca ttc tta ggt gta ctt ttg ccg ttt agc ttt      288
41      Ile Phe Ile Leu Gly Ala Phe Leu Gly Val Leu Leu Pro Phe Ser Phe
42      85          90          95
43      ggc gct tat cat gtt cat aat agc gat agc gac ttg ttt gac aac ttt      336
44      Gly Ala Tyr His Val His Asn Ser Asp Ser Asp Leu Phe Asp Asn Phe

```

RAW SEQUENCE LISTING

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TIME: 13:26:07

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

45		100		105		110		
46	gta aat ttt gat tca ctt aaa gtg tat ttg gat gat tgg aaa gat gtt							384
47	Val Asn Phe Asp Ser Leu Lys Val Tyr Leu Asp Asp Trp Lys Asp Val							
48		115		120		125		
49	ctc cca caa ggt ata agt tcg ttt att gat gat att cag gct ggt aac							432
50	Leu Pro Gln Gly Ile Ser Ser Phe Ile Asp Asp Ile Gln Ala Gly Asn							
51		130		135		140		
52	tac tcc aca tct tct tta gat gat ctc agt gaa aat ttt gcc gtt ggt							480
53	Tyr Ser Thr Ser Ser Leu Asp Asp Leu Ser Glu Asn Phe Ala Val Gly							
54		145		150		155		160
55	aaa caa ctc tta cgt gat tat aat atc gag gcc aaa cat cct gtt gta							528
56	Lys Gln Leu Leu Arg Asp Tyr Asn Ile Glu Ala Lys His Pro Val Val							
57			165		170		175	
58	atg gtt cct ggt gtc att tct acg gga att gaa agc tgg gga gtt att							576
59	Met Val Pro Gly Val Ile Ser Thr Gly Ile Glu Ser Trp Gly Val Ile							
60		180		185		190		
61	gga gac gat gag tgc gat agt tct gcg cat ttt cgt aaa cgg ctg tgg							624
62	Gly Asp Asp Glu Cys Asp Ser Ser Ala His Phe Arg Lys Arg Leu Trp							
63		195		200		205		
64	gga agt ttt tac atg ctg aga aca atg gtt atg gat aaa gtt tgt tgg							672
65	Gly Ser Phe Tyr Met Leu Arg Thr Met Val Met Asp Lys Val Cys Trp							
66		210		215		220		
67	ttg aaa cat gta atg tta gat cct gaa aca ggt ctg gac cca ccg aac							720
68	Leu Lys His Val Met Leu Asp Pro Glu Thr Gly Leu Asp Pro Pro Asn							
69		225		230		235		240
70	ttt acg cta cgt gca gca cag ggc ttc gaa tca act gat tat ttc atc							768
71	Phe Thr Leu Arg Ala Ala Gln Gly Phe Glu Ser Thr Asp Tyr Phe Ile							
72			245		250		255	
73	gca ggg tat tgg att tgg aac aaa gtt ttc caa aat ctg gga gta att							816
74	Ala Gly Tyr Trp Ile Trp Asn Lys Val Phe Gln Asn Leu Gly Val Ile							
75		260		265		270		
76	ggc tat gaa ccc aat aaa atg acg agt gct gcg tat gat tgg agg ctt							864
77	Gly Tyr Glu Pro Asn Lys Met Thr Ser Ala Ala Tyr Asp Trp Arg Leu							
78		275		280		285		
79	gca tat tta gat cta gaa aga cgc gat agg tac ttt acg aag cta aag							912
80	Ala Tyr Leu Asp Leu Glu Arg Arg Asp Arg Tyr Phe Thr Lys Leu Lys							
81		290		295		300		
82	gaa caa atc gaa ctg ttt cat caa ttg agt ggt gaa aaa gtt tgt tta							960
83	Glu Gln Ile Glu Leu Phe His Gln Leu Ser Gly Glu Lys Val Cys Leu							
84		305		310		315		320
85	att gga cat tct atg ggt tct cag att atc ttt tac ttt atg aaa tgg							1008
86	Ile Gly His Ser Met Gly Ser Gln Ile Ile Phe Tyr Phe Met Lys Trp							
87			325		330		335	
88	gtc gag gct gaa ggc cct ctt tac ggt aat ggt ggt cgt ggc tgg gtt							1056
89	Val Glu Ala Glu Gly Pro Leu Tyr Gly Asn Gly Gly Arg Gly Trp Val							
90		340		345		350		
91	aac gaa cac ata gat tca ttc att aat gca gca ggg acg ctt ctg ggc							1104
92	Asn Glu His Ile Asp Ser Phe Ile Asn Ala Ala Gly Thr Leu Leu Gly							
93		355		360		365		

RAW SEQUENCE LISTING

DATE: 09/22/2003

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TIME: 13:26:07

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

94	gct cca aag gca gtt cca gct cta att agt ggt gaa atg aaa gat acc	1152
95	Ala Pro Lys Ala Val Pro Ala Leu Ile Ser Gly Glu Met Lys Asp Thr	
96	370 375 380	
97	att caa tta aat acg tta gcc atg tat ggt ttg gaa aag ttc ttc tca	1200
98	Ile Gln Leu Asn Thr Leu Ala Met Tyr Gly Leu Glu Lys Phe Phe Ser	
99	385 390 395 400	
100	aga att gag aga gta aaa atg tta caa acg tgg ggt ggt ata cca tca	1248
101	Arg Ile Glu Arg Val Lys Met Leu Gln Thr Trp Gly Gly Ile Pro Ser	
102	405 410 415	
103	atg cta cca aag gga gaa gag gtc att tgg ggg gat atg aag tca tct	1296
104	Met Leu Pro Lys Gly Glu Glu Val Ile Trp Gly Asp Met Lys Ser Ser	
105	420 425 430	
106	tca gag gat gca ttg aat aac aac act gac aca tac ggc aat ttc att	1344
107	Ser Glu Asp Ala Leu Asn Asn Asn Thr Asp Thr Tyr Gly Asn Phe Ile	
108	435 440 445	
109	cga ttt gaa agg aat acg agc gat gct ttc aac aaa aat ttg aca atg	1392
110	Arg Phe Glu Arg Asn Thr Ser Asp Ala Phe Asn Lys Asn Leu Thr Met	
111	450 455 460	
112	aaa gac gcc att aac atg aca tta tcg ata tca cct gaa tgg ctc caa	1440
113	Lys Asp Ala Ile Asn Met Thr Leu Ser Ile Ser Pro Glu Trp Leu Gln	
114	465 470 475 480	
115	aga aga gta cat gag cag tac tcg ttc ggc tat tcc aag aat gaa gaa	1488
116	Arg Arg Val His Glu Gln Tyr Ser Phe Gly Tyr Ser Lys Asn Glu Glu	
117	485 490 495	
118	gag tta aga aaa aat gag cta cac cac aag cac tgg tcg aat cca atg	1536
119	Glu Leu Arg Lys Asn Glu Leu His His Lys His Trp Ser Asn Pro Met	
120	500 505 510	
121	gaa gta cca ctt cca gaa gct ccc cac atg aaa atc tat tgt ata tac	1584
122	Glu Val Pro Leu Pro Glu Ala Pro His Met Lys Ile Tyr Cys Ile Tyr	
123	515 520 525	
124	ggg gtg aac aac cca act gaa agg gca tat gta tat aag gaa gag gat	1632
125	Gly Val Asn Asn Pro Thr Glu Arg Ala Tyr Val Tyr Lys Glu Glu Asp	
126	530 535 540	
127	gac tcc tct gct ctg aat ttg acc atc gac tac gaa agc aag caa cct	1680
128	Asp Ser Ser Ala Leu Asn Leu Thr Ile Asp Tyr Glu Ser Lys Gln Pro	
129	545 550 555 560	
130	gta ttc ctc acc gag ggg gac gga acc gtt ccg ctc gtg gcg cat tca	1728
131	Val Phe Leu Thr Glu Gly Asp Gly Thr Val Pro Leu Val Ala His Ser	
132	565 570 575	
133	atg tgt cac aaa tgg gcc cag ggt gct tca ccg tac aac cct gcc gga	1776
134	Met Cys His Lys Trp Ala Gln Gly Ala Ser Pro Tyr Asn Pro Ala Gly	
135	580 585 590	
136	att aac gtt act att gtg gaa atg aaa cac cag cca gat cga ttt gat	1824
137	Ile Asn Val Thr Ile Val Glu Met Lys His Gln Pro Asp Arg Phe Asp	
138	595 600 605	
139	ata cgt ggt gga gca aaa agc gcc gaa cac gta gac atc ctc ggc agc	1872
140	Ile Arg Gly Gly Ala Lys Ser Ala Glu His Val Asp Ile Leu Gly Ser	
141	610 615 620	
142	gcg gag ttg aac gat tac atc ttg aaa att gca agc ggt aat ggc gat	1920

RAW SEQUENCE LISTING

DATE: 09/22/2003

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TIME: 13:26:07

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

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143      Ala Glu Leu Asn Asp Tyr Ile Leu Lys Ile Ala Ser Gly Asn Gly Asp
144      625                630                635                640
145      ctc gtc gag cca cgc caa ttg tct aat ttg agc cag tgg gtt tct cag 1968
146      Leu Val Glu Pro Arg Gln Leu Ser Asn Leu Ser Gln Trp Val Ser Gln
147                        645                650                655
148      atg ccc ttc cca atg taa 1986
149      Met Pro Phe Pro Met
150                        660
152 <210> SEQ ID NO: 2
153 <211> LENGTH: 661
154 <212> TYPE: PRT
155 <213> ORGANISM: Saccharomyces cerevisiae
156 <400> SEQUENCE: 2
157      Met Gly Thr Leu Phe Arg Arg Asn Val Gln Asn Gln Lys Ser Asp Ser
158      1                5                10                15
159      Asp Glu Asn Asn Lys Gly Gly Ser Val His Asn Lys Arg Glu Ser Arg
160                        20                25                30
161      Asn His Ile His His Gln Gln Gly Leu Gly His Lys Arg Arg Arg Gly
162                        35                40                45
163      Ile Ser Gly Ser Ala Lys Arg Asn Glu Arg Gly Lys Asp Phe Asp Arg
164                        50                55                60
165      Lys Arg Asp Gly Asn Gly Arg Lys Arg Trp Arg Asp Ser Arg Arg Leu
166      65                70                75                80
167      Ile Phe Ile Leu Gly Ala Phe Leu Gly Val Leu Leu Pro Phe Ser Phe
168                        85                90                95
169      Gly Ala Tyr His Val His Asn Ser Asp Ser Asp Leu Phe Asp Asn Phe
170                        100               105               110
171      Val Asn Phe Asp Ser Leu Lys Val Tyr Leu Asp Asp Trp Lys Asp Val
172                        115               120               125
173      Leu Pro Gln Gly Ile Ser Ser Phe Ile Asp Asp Ile Gln Ala Gly Asn
174      130               135               140
175      Tyr Ser Thr Ser Ser Leu Asp Asp Leu Ser Glu Asn Phe Ala Val Gly
176      145               150               155               160
177      Lys Gln Leu Leu Arg Asp Tyr Asn Ile Glu Ala Lys His Pro Val Val
178                        165               170               175
179      Met Val Pro Gly Val Ile Ser Thr Gly Ile Glu Ser Trp Gly Val Ile
180                        180               185               190
181      Gly Asp Asp Glu Cys Asp Ser Ser Ala His Phe Arg Lys Arg Leu Trp
182                        195               200               205
183      Gly Ser Phe Tyr Met Leu Arg Thr Met Val Met Asp Lys Val Cys Trp
184      210               215               220
185      Leu Lys His Val Met Leu Asp Pro Glu Thr Gly Leu Asp Pro Pro Asn
186      225               230               235               240
187      Phe Thr Leu Arg Ala Ala Gln Gly Phe Glu Ser Thr Asp Tyr Phe Ile
188                        245               250               255
189      Ala Gly Tyr Trp Ile Trp Asn Lys Val Phe Gln Asn Leu Gly Val Ile
190                        260               265               270
191      Gly Tyr Glu Pro Asn Lys Met Thr Ser Ala Ala Tyr Asp Trp Arg Leu
192      275               280               285

```

RAW SEQUENCE LISTING

DATE: 09/22/2003

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TIME: 13:26:07

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

```

193   . Ala Tyr Leu Asp Leu Glu Arg Arg Asp Arg Tyr Phe Thr Lys Leu Lys
194       290               295               300
195   Glu Gln Ile Glu Leu Phe His Gln Leu Ser Gly Glu Lys Val Cys Leu
196   305               310               315               320
197   Ile Gly His Ser Met Gly Ser Gln Ile Ile Phe Tyr Phe Met Lys Trp
198               325               330               335
199   Val Glu Ala Glu Gly Pro Leu Tyr Gly Asn Gly Gly Arg Gly Trp Val
200               340               345               350
201   Asn Glu His Ile Asp Ser Phe Ile Asn Ala Ala Gly Thr Leu Leu Gly
202               355               360               365
203   Ala Pro Lys Ala Val Pro Ala Leu Ile Ser Gly Glu Met Lys Asp Thr
204   370               375               380
205   Ile Gln Leu Asn Thr Leu Ala Met Tyr Gly Leu Glu Lys Phe Phe Ser
206   385               390               395               400
207   Arg Ile Glu Arg Val Lys Met Leu Gln Thr Trp Gly Gly Ile Pro Ser
208               405               410               415
209   Met Leu Pro Lys Gly Glu Glu Val Ile Trp Gly Asp Met Lys Ser Ser
210               420               425               430
211   Ser Glu Asp Ala Leu Asn Asn Asn Thr Asp Thr Tyr Gly Asn Phe Ile
212               435               440               445
213   Arg Phe Glu Arg Asn Thr Ser Asp Ala Phe Asn Lys Asn Leu Thr Met
214   450               455               460
215   Lys Asp Ala Ile Asn Met Thr Leu Ser Ile Ser Pro Glu Trp Leu Gln
216   465               470               475               480
217   Arg Arg Val His Glu Gln Tyr Ser Phe Gly Tyr Ser Lys Asn Glu Glu
218               485               490               495
219   Glu Leu Arg Lys Asn Glu Leu His His Lys His Trp Ser Asn Pro Met
220               500               505               510
221   Glu Val Pro Leu Pro Glu Ala Pro His Met Lys Ile Tyr Cys Ile Tyr
222               515               520               525
223   Gly Val Asn Asn Pro Thr Glu Arg Ala Tyr Val Tyr Lys Glu Glu Asp
224   530               535               540
225   Asp Ser Ser Ala Leu Asn Leu Thr Ile Asp Tyr Glu Ser Lys Gln Pro
226   545               550               555               560
227   Val Phe Leu Thr Glu Gly Asp Gly Thr Val Pro Leu Val Ala His Ser
228               565               570               575
229   Met Cys His Lys Trp Ala Gln Gly Ala Ser Pro Tyr Asn Pro Ala Gly
230               580               585               590
231   Ile Asn Val Thr Ile Val Glu Met Lys His Gln Pro Asp Arg Phe Asp
232               595               600               605
233   Ile Arg Gly Gly Ala Lys Ser Ala Glu His Val Asp Ile Leu Gly Ser
234   610               615               620
235   Ala Glu Leu Asn Asp Tyr Ile Leu Lys Ile Ala Ser Gly Asn Gly Asp
236   625               630               635               640
237   Leu Val Glu Pro Arg Gln Leu Ser Asn Leu Ser Gln Trp Val Ser Gln
238               645               650               655
239   Met Pro Phe Pro Met
240               660
242 <210> SEQ ID NO: 3

```

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/09/537,710C

DATE: 09/22/2003
TIME: 13:26:08

Input Set : N:\EBONY'S\US09537710C.RAW.txt
Output Set: N:\CRF4\09222003\I537710C.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:5; N Pos. 2363
Seq#:7; N Pos. 601,627
Seq#:7; Xaa Pos. 116,121
Seq#:9; N Pos. 15,45,83,103,107,112,210
Seq#:18; N Pos. 240,385
Seq#:18; Xaa Pos. 41,89
Seq#:19; N Pos. 15,45,83,103,107,112,210

Invalid Line Length:

The rules require that a line not exceed 72 characters in length. This includes spaces.

Seq#:1; Line(s) 6

VERIFICATION SUMMARY

DATE: 09/22/2003

PATENT APPLICATION: US/09/537,710C

TIME: 13:26:08

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

L:10 M:270 C: Current Application Number differs, Wrong Format
L:403 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:2340
L:534 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7 after pos.:384
M:341 Repeated in SeqNo=7
L:575 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:9 after pos.:0
M:341 Repeated in SeqNo=9
L:1065 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:18 after pos.:215
M:341 Repeated in SeqNo=18
L:1087 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:0
M:341 Repeated in SeqNo=19

STATISTICS SUMMARY

PATENT APPLICATION: US/09/537,710C

DATE: 09/22/2003

TIME: 13:26:08

Input Set : N:\EBONY'S\US09537710C.RAW.txt

Output Set: N:\CRF4\09222003\I537710C.raw

Application Serial Number: US/09/537,710C

Alpha or Numeric or Xml: Numeric

Application Class:

Application File Date: 03-30-2000

Art Unit: 1600

Software Application: WORDPERFECT

Total Number of Sequences: 19

Total Nucleotides: 18754

Total Amino Acids: 3830

Number of Errors: 0

Number of Warnings: 14

Number of Corrections: 1

MESSAGE SUMMARY

270 C: 1 (Current Application Number differs)

341 W: 14 ((46) "n" or "Xaa" used)